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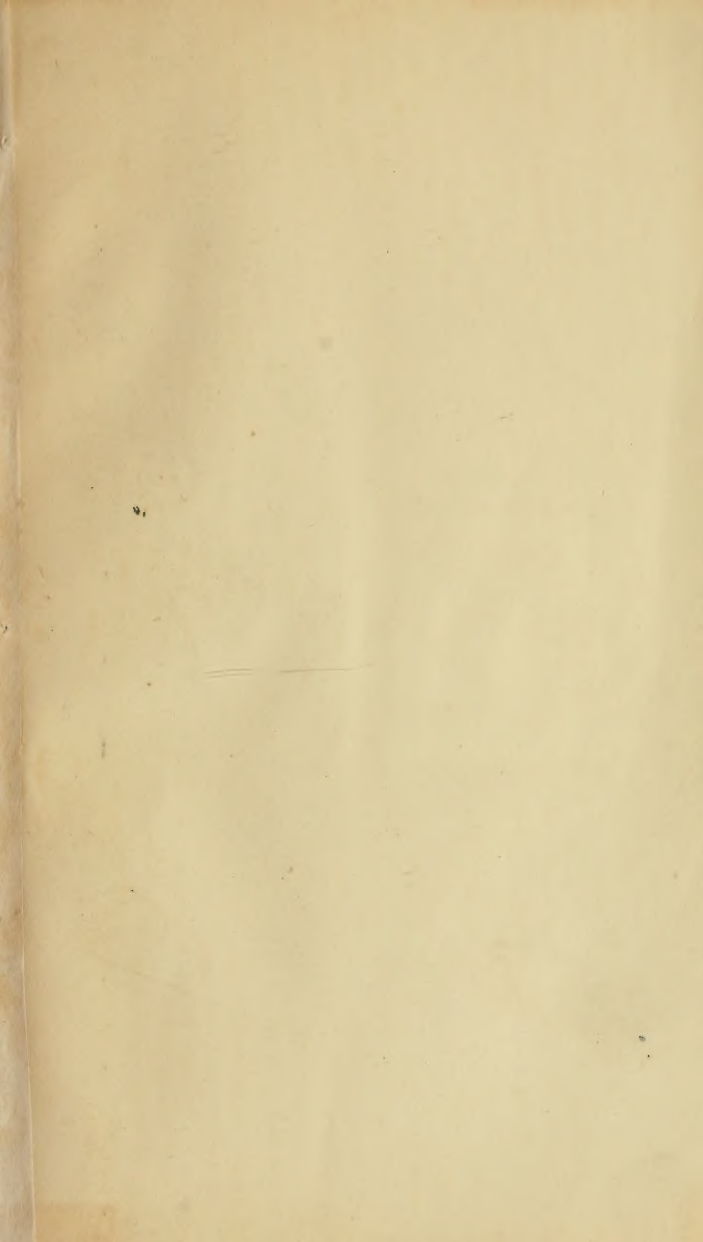
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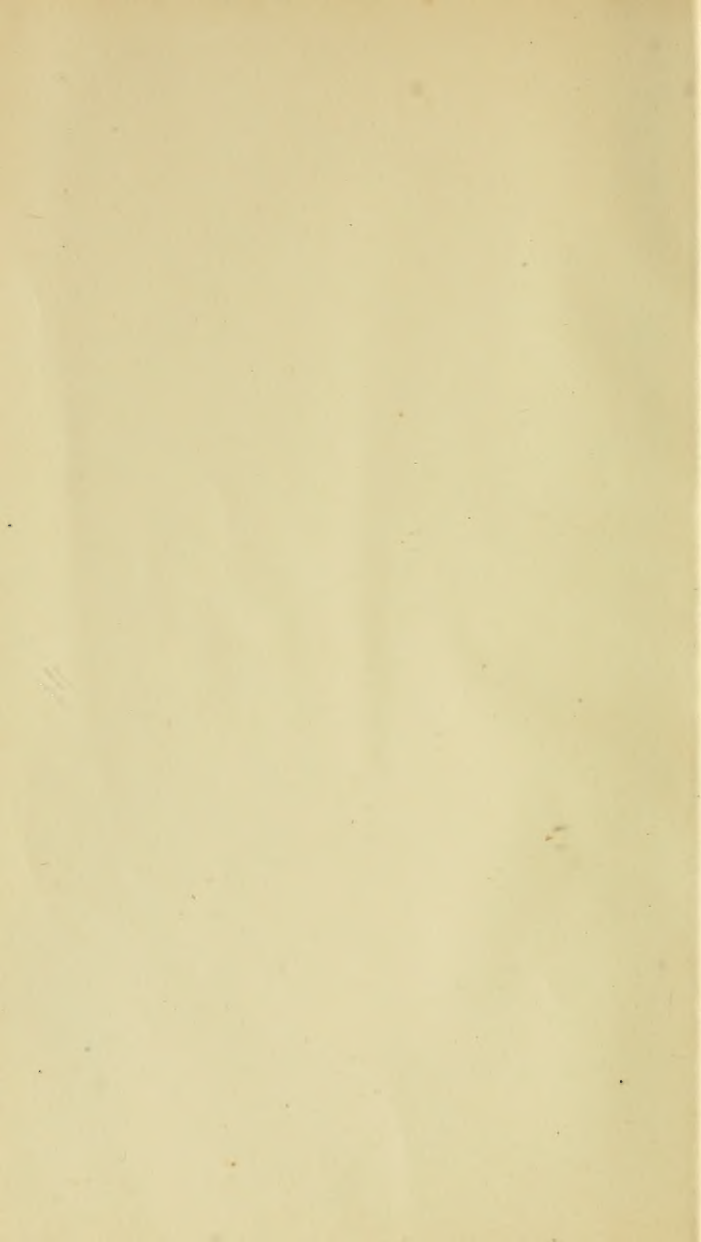
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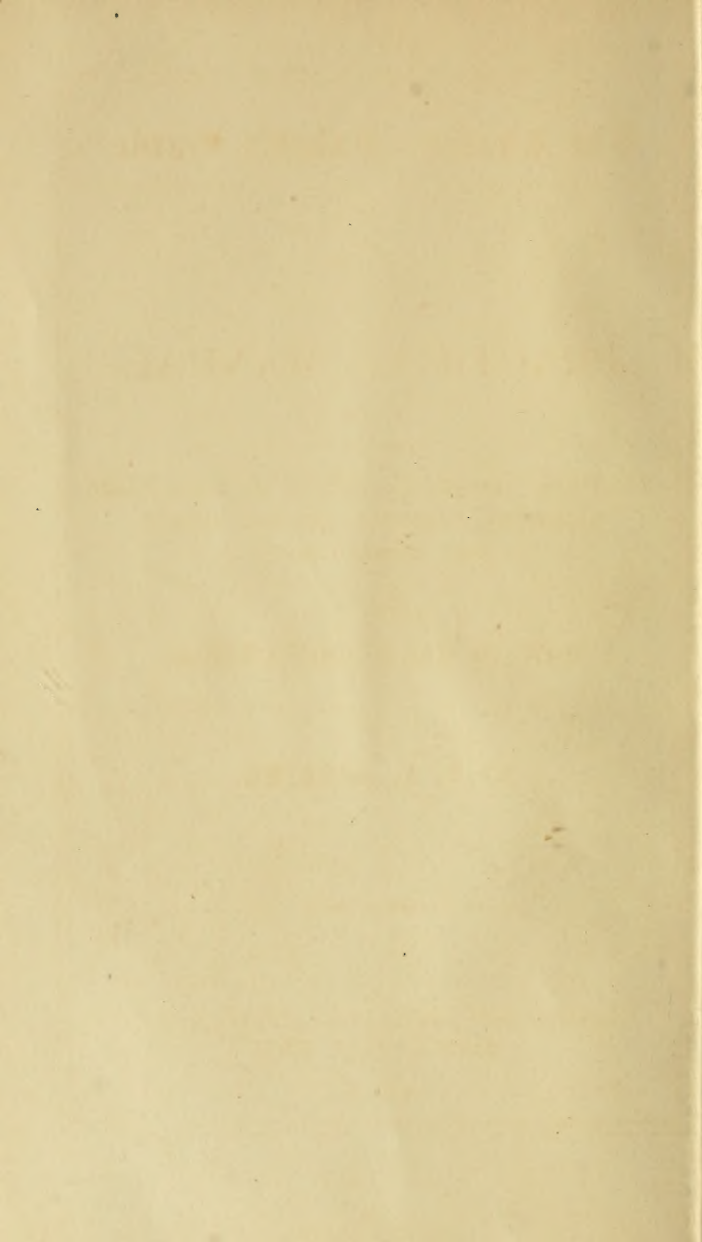
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The Cheese - Maker's Guide.

A

PRACTICAL MANUAL

CONTAINING HIGHLY IMPORTANT INFORMATION TO
DAIRYMEN, FARMERS, AND ALL OTHERS
WHO WISH TO KNOW

HOW TO MAKE GOOD CHEESE.



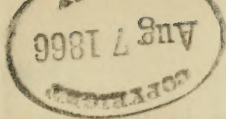
BY C. A. CODDING.

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Manual on Making Cheese.

AT the earnest solicitation of many cheese-makers, and many who would like to make cheese, and knowing that a work of this kind was much needed, I have, in the last three years, spared no pains nor expense in collecting together all the best reports and ideas I could find on this subject. These, with my own experience, I now give in as condensed a form as I can, and at the same time allude to the variety of circumstances that have a bearing upon the intricate science of making cheese.

GENERAL IDEAS ON MAKING CHEESE.

In the first place, milk is a very sensitive fluid, and liable to be varied in quality by impure water, filthy and ill-ventilated stables, change of feed, and excess of feeding, excitement of temper, irregular milking, salting, &c., all of which destroy its susceptibility to produce like effects. Cheese, when pressed and exposed in a curing process, is no less sensitive, and equally liable to be varied in texture and flavor by exposure to excess of heat, bad air, &c., the effects of which I shall hereafter notice.

Those leading principles which form the basis of operations should be closely adhered to in all

cases in the process of manufacturing cheese. Rennet, heat, salt, and pressure, are the principal agents used in converting milk into cheese, the flavor and texture of which is determined by their proportionate use. The proportion is varied by different dairymen according to their notions of propriety, and as best adapted to their fixtures and experiences. Hence arises the great inequality in cheese-makers in the same neighborhood. Some of their cheese is matured at an earlier period, while others mature later, and are not as early ready for market. Some of their cheese is good, and some is bad. It is therefore very necessary that those who make cheese should have a good and sufficient guide to the science; yet it is by practical experience and close observation that the cheese-maker can learn to adapt his knowledge and practice perfectly to the frequent and extreme changes to which our climate is subject—varying the quality of milk, and materially affecting cheese in process of curing.

The evening's and morning's milk is commonly used to make one cheese. The evening's milk is strained into a tub and cooled, to prevent it from souring. This is done by setting pails, filled with cold water, into the tub, and stirring the milk till cool; but little cream will rise over night. The cream is taken from the evening's milk, and kept till the evening's and morning's milk are put together, and warmed, to receive the rennet. This is often done by heating a part of the evening's milk to a temperature that will warm the whole mass. That method of heating is objectionable, because the natural affinity which it is necessary to preserve between the constituent parts is destroyed. A perfect coherence is destroyed by a

portion of the milk's being over-heated. It is better to warm the whole mass in a manner that will produce an equilibrium of heat, which is best done by placing the vessel containing the milk within a larger vessel, with three inches of space under the bottom, and two inches of space at the sides, into which space water may be put to cool the milk, and into which steam may be let to warm the milk and scald the curd. The more water there is surrounding the milk, the more uniform will be the heat. The cream, if added (which is generally done), is best incorporated with the milk by putting it with three times its quantity of new, warm milk from the cow, and adding warm water to raise its temperature to ninety-eight degrees. Stir it till perfectly limpid, add the cream to the milk, and then put in the rennet, that the same stirring may mix both at once with the mass.

If milk is curdled below eighty-four degrees, the cream is more liable to work off with the whey. An extreme of heat will have a like effect. Curdling heat is varied with the temperature of the air, or the liability of the milk to cool after adding the rennet. A fine cloth spread over the tub while the milk is curdling, will prevent the surface from being cooled by the circulation of air. No jarring of the milk by walking on the floor, or otherwise, should be allowed while milk is curdling, as it prevents a perfect coherence.

When milk is curdled so as to appear like a solid, it is divided into small particles to aid the separation of the whey from the curd. This is often too speedily done to facilitate the work, and at a sacrifice of quality and quantity.

The four indispensable agents, rennet, heat, salt, and pressure, rightly applied, must keep pace

with each other in effect. The two former operating to sub-divide, the latter to aid cohesion by bringing the parts of a sameness in closer contact. This should be skillfully and studiously applied, in a mild way, according to the capacity of the curd to receive it. The less friction there is in working the curd, the less will be the waste. If heat is raised too fast, or commenced while the curd is too young, the effect of the rennet will be checked, and decomposition will not be complete, and will result in a "leaky" cheese.

Heat may be raised in scalding to keep pace with the rennet. If the rennet is quick, heat may be raised quick ; if slow, heat must be raised slow, and held longer. Scalding heat may be carried from ninety-two to one hundred degrees, according to the size of the cheese, and the temperature to which the cheese is exposed. During the process of scalding, the whey and curd should be kept in motion to prevent the curd from settling and sticking together, as separating it, is attended with great labor and waste from friction. When the curd is cooked, so that it feels elastic and will squeak when chewed with the front teeth, it is ready to be separated from the whey, to receive salt. This is done by dipping it into a strainer, over a basket or sink, or drained off and salted in the tub. Either may be done without its adhering in lumps, by stirring it in a small portion of whey till cooled to ninety-four degrees. This is the most critical part of the process, and where cheese-makers are most likely to err, as the portion of salt retained in the cheese after pressing will be in proportion to the capacity of the curd to receive it when added.

At a particular period and temper of the curd

when draining off whey, it will absorb salt freely, and after being thoroughly mixed and packed up for a few minutes, while warm, it will be evenly shrunk and cleansed by salt, and the whey will press out freely. But if the curd is not well cooked, or cooled too fast in draining off the whey, it will acquire a degree of stubbornness, and prevent the absorption of salt to shrink and cleanse it, and no amount of pressure will be sufficient to drive out the fluids. If the curd is not worked evenly, the larger lumps will not be cooked enough, or the smaller too much (like large and small loaves of bread baked together in the same oven), hence the cheese is left impregnated with the elements of fermentation, which increase on being exposed to heat till the cheese is sufficiently "huffed," or swollen, for each constituent to occupy a separate space in the same rind, or shell. The fluids first attract together by affinity, forming small cavities, in which they remain unaffected by salt, become fetid, and generate an unpleasant odor.

Curd should be salted warm (it is then the most absorbent), and somewhat cooled before putting it to press to suppress the combined action of heat and rennet. The quantity of salt required varies with the condition of the curd, size of the cheese, and amount of heat to which the cheese is exposed in curing.

A well-worked cheese, from seventy-five to one hundred pounds, requires one pound of refined salt to forty pounds of curd to remain in the cheese after it is pressed, and exposed to a temperature of from seventy to eighty degrees. This may be varied from two to three pounds to the hundred, according to the texture of cheese desired—a small cheese requiring less, and a large cheese more.

A degree of moisture is necessary in cheese for a malleable texture, but this should not be from animal fluid contained in the curd. A high-salted cheese immediately exposed to high temperature, becomes sour, hard, dry, and crumbling; the same exposed to a cool, damp atmosphere, retains sufficient moisture to be soft, yet solid. A cheese light-salted, in a high temperature, will cure quick, become porous, huffy, and stale.

Curd from hay-milk requires much less salt than that from grass or grain feed, as it is poorer, and will retain salt like lean meats. The richer the milk the more salt is required to control the animal properties, and the less absorbent the curd; the pores being filled with the finer, watery particles. More salt is required in hot weather, also, to overrule the continued action of rennet and heat, neither of which will be effectual alone.

When the curd is ready to press it is important to dispossess it of these decomposing agents. The gastric juice, or coagulator, is a fluid, and should work off with the animal fluids in the whey; and the only way to get rid of it is to work the curd down fine and solid, and work the whey all out. Then cool the curd before pressing, and the cheese will be solid and keep its place. But if the whey is not all worked out, the decomposer is yet on hand, continues its action (aided by heat) till an equilibrium of chemical action is destroyed in the cheese, and the fluid properties leak out in fetid whey and oil, leaving it a rank and worthless article. In short, the proper method of using salt must be arrived at by a close observation as to its chemical combination with the constituent properties at different ages of the cheese, with different sizes, heat, dampness, &c.

When the curd is properly tempered for pressing, a cotton or linen cloth is spread over the hoop and the curd is put in. The press should be faithful, and follow down (as the curd yields when young), to press out the whey and atmosphere before a rind is formed to prevent their escape. There is no danger of too much pressure after the first hour. The cloth should be cleansed with lye often to keep the rind from cracking. The cloth is taken from the cheese when it is removed from the press. The cheese is set on a table for a few hours, till dry enough to absorb oil, and then painted with *anotta*, mixed in strong lye (from common ashes), kept in a jar for ready use. This toughens the rind so that it will not require much grease after the first coat to make a smooth rind, if rubbed often with the hand moistened in oil.

A firm rind may be formed upon cheese, when young, by a careful exposure to drying air, frequent rubbing with the hand, and no more oil than will readily incorporate with the rind. If more oil is used than will be taken up, it will sooner or later flake off, leaving the cheese scabby, exposed to flies, mould, &c. Oil for greasing cheese is obtained from butter melted over a slow fire, till it is turned to oil. A preparation impervious to flies, is made by mixing cayenne pepper with the oil, or steeping red peppers in the oil, and then add from one-eighth to one-quarter beeswax; this makes a smooth coating for cheese.

It is most desirable that cheese should be in a proportion half as thick as they are wide. The size of the hoop may be calculated from the number of gallons of milk you have to set; each gallon should make one pound of cheese, if properly worked.

A cheese 20 inches wide weighs 12 lbs. to each inch in depth.

"	18	"	"	9	"	"
"	16	"	"	7	"	"
"	14	"	"	$5\frac{1}{4}$	"	"
"	12	"	"	$4\frac{1}{4}$	"	"
"	10	"	"	$3\frac{1}{8}$	"	"

Cheese of the above proportions are banded with cotton cloth to keep them in shape. Heavy cheese must be banded with cloth that will not stretch, or its gravity will make them ill-shaped.

Much of the bad flavor complained of in cheese may be prevented with proper attention to curing. In addition to the extreme changes of weather in our climate, which are more than sufficient to destroy the constitution of a well-manufactured cheese, the practice too generally prevails of placing cheese in some loft or upper room least needed for other uses, and often next to a roof where heat concentrates, and the cheese becomes literally baked. I deem such rooms best as are calculated to preserve an equilibrium of low temperature. A tight, spacious, studded and plastered lower room, well ventilated with northern exposure, where heat may be increased, and air dried by fire, or cooled and dampened, if required, by air from an underground or adjoining room, where ice may be kept, is best adapted to the curing of cheese.

An experiment with sixty dairies being gotten up expressly for shipment, a selection was made from the largest and most experienced dairymen in thirteen towns. A vigorous effort was made to reduce the whole practice to one general rule, consisting of an equilibrium of heat in milk, to set, not exceeding ninety degrees, with pure rennet to curdle the milk, in forty minutes; the curd was thoroughly worked by hand till it was as fine when scalded as wheat or corn; the curd was

scalded in whey with heat not exceeding one hundred degrees, and that heat held until the curd appeared shrunk, and would squeak when pressed between the front teeth; the whey to be drained off, and the curd salted while warm, with two and a half pounds of refined salt to one hundred pounds of cheese, and cooled and pressed in cheese half as high as wide.

These leading points being strictly adhered to were found adequate to produce the article required, where curing rooms were constructed so as to preserve a uniform moderate temperature. The cheese not being affected by extreme changes of climate, fermented slowly and uniform, the rind was firm and smooth, with little oil, the texture was firm and solid, yet malleable like butter; the flavor mild and pleasant. The weather being cool, a great uniformity was manifest in shape and texture. A dry room was found best for a wet cheese and a damp room best for a dry cheese; but in no case was a higher temperature than seventy-five degrees found necessary.

The results in experimenting are always in favor of a medium rate of salt and heat. High salting, and heat, making hard, smart cheese, low salting and heat, soft, mild, and tasteless cheese; low salting and high heat, porous, salt and sharp cheese.

It is a common practice among dairymen to use artificial coloring for cheese. In preparing coloring matter, use clean lye, from common ashes. Place the anotta in it, over a fire, and boil until it is thoroughly incorporated. Then allow it to settle, use only the clear portions, carefully avoiding the dregs. This infusion is to be added to the milk of which cheese is to be made (when

ready for setting) as much as will make the milk a bright orange color, which will become the deeper as the cheese gets age. The addition of the anotta in no way affects the taste or smell of the cheese. Anotta is a preparation from the red pulp that covers the seeds of an American Tree—the annatto tree.

The question of cooling milk, is deemed an important one by some dairymen. They believe that milk should be stirred while cooling, to allow certain properties to pass off that should not go into the cheese, and then raise the heat by artificial means for setting. Some dairymen believe the night's and morning's milk should be kept apart, because of antagonisms in their constituent parts. The difference of night from day feeding makes a difference in the milk, and the two milkings will not readily and fully unite because of antagonisms; also with mixing sour and sweet, or cold and warm milk.

RULES FOR MAKING SMALL CHEESE.

Strain the milk into a tub, and add rennet sufficient to produce coagulation in from forty to fifty minutes, keep the milk agitated from this time until coagulation begins, and then leave perfectly still until the curd is sufficiently fixed, which requires a period of from forty minutes to one and a half hours. Then cut it into squares of an inch or so in size, as quickly and with as little agitation as possible; when it begins to whey, break it up with the hands. If it starts the white whey, it has not stood long enough. As soon as the basket will hold it, dip it in and break it up a few times. Gather up the strainer, and let it stand

until morning. There is no danger of its souring. Scald and dry the tub. Warm the tub with hot water before straining in the morning's milk, and proceed as aforesaid. When you have broken up the morning's curd, let it stand and settle a few minutes; then remove a portion of the whey by placing over it a cloth strainer and dipping it out. In this way you will not waste curd. When you have removed a sufficient quantity of the whey, turn in a little hot whey at a time, as you move the curd with the hands, to keep the curd from scalding. In this way you will readily work it down. When this curd is about half worked down, warm the last night's curd in warm whey, and put it in the tub with the other. When the whey is worked out, and the curd is broken up fine, it needs scalding or cooking. This is done by putting in a little hot whey, at a time when you have sufficient whey in. The curd should be about as hot as you can bear your hand in. During the process of scalding, the whey and curd should be kept in motion, to prevent the curd from settling and sticking together. When the curd is cooked, so that it will squeak when chewed with the front teeth, turn out the whey; then salt the curd with about one ounce of salt to three pounds of curd; let the curd cool for a few minutes, then put it to press.

When the cheeses are pressed, they should be greased, rubbed, and turned daily for a few days, keeping them in as suitable a place as you have.

If you bandage cheese, you should put them back into the press, and press the bandage on thoroughly; this you will find to be a great preventive to flies and mould.

THE SAVING AND USING OF RENNET.

Various opinions exist as to the best mode of saving rennet, and that is generally adopted which will curdle the most milk. The mode that will preserve the greatest amount of strength, and best flavor, so that it may be smelt and tasted with a good relish when put into the milk, I consider the best. Any composition not thus kept, I deem unfit for use, as the coagulator is an essential agent in cheesing the curd, and sure to impart its own flavor. The rennet, or stomach, should never be taken from the calf until the excrement shows the calf to be in perfect health.

As the coagulator is a secretion of gastric juice in the muscular fibres of the stomach, and as different opinions exist as to the propriety of letting the calf suck before killing, and throwing away the curd in the stomach, I will refer the cheesemaker to W. BEAUMONT, M. D., the best authority in existence on digestion :

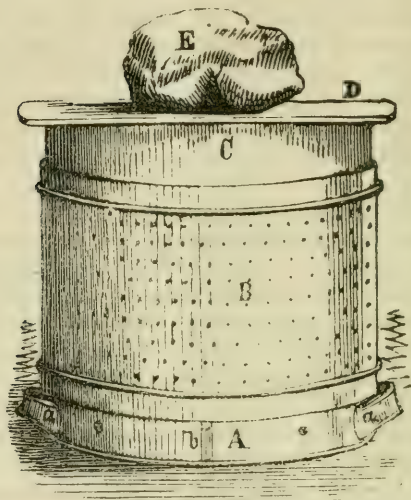
“I infer that the first effect of aliment on the stomach, is one of irritation of the gastric *papillæ*, thus exciting the discharge of the gastric juice, and stimulating the muscular fibres of the stomach. By this means the aliment is uniformly mixed with the gastric juice, which is constantly being secreted in proportion to the quantity of food received into the stomach, unless that be too much for the wants of the economy.”

I think this reference shows that the calf should either be killed when the stomach is empty, or the curd should be saved, if the calf is allowed to suck, soon enough before killing to have curd in the stomach. In either case, the rennet should neither be scraped nor rinsed. The best way to save rennet, in my opinion, is this: Having cleaned off

from the cow's bag all dirt and loose hairs, let the calf suck one or two quarts, then kill it within fifteen or twenty minutes. After taking out the stomach, turn the curd into a pan, pick out the hairs, if there are any, salt the inside of the stomach well, salt the curd and return it to the rennet. Having salted the outside thoroughly, gather it on a wooden pin, and hang it up in a cool, dry place to drain and dry. A rennet should not be allowed to gather dampness, or its strength will evaporate. Care should be taken not to let them sour or taint.

To prepare rennet for use, the proportion should be thus: Into three gallons of water (blood warm) put two quarts of salt, and two good rennets, cut open; churn or rub them often for a day or two, then press them to get the full strength. Strain and settle the liquid, separate it from sediment, if any, and it is ready for use. One lemon, one-half ounce of cloves, one-half ounce of cinnamon, and one ounce of common sage, are often added to the liquor to preserve its flavor and quicken its action. If kept cool in a stone jar, it will keep sweet any length of time desired, and a uniform strength can be secured while it lasts. Stir it before dipping off, to set milk. Take of it enough to curdle the milk in forty minutes. Experience must be your guide.

CHARLES A. CODDING'S PATENT IMPROVED



CHEESE PRESS & DRAINER.

PATENTED JULY 16, 1861 : PATENTED JANUARY 28, 1862.

This Press is exceedingly convenient, compact, and complete. With all its appurtenances, it is only a little larger than the space occupied by the curd.

References and Explanations.

A is the Base ; B the Cylinder ; C the Follower ; D the Cover ; E the Weight ; a a the Handles, and b b the Stops.

The Base and Follower are so supported as to keep true under any necessary amount of pressure. The Base being placed suitably for pressing or draining, the Cylinder is slid

a little way over its upper end, until it rests upon the Handles and Stops. The curd, after being placed in the Cylinder, is pressed by placing the Follower into the upper end of the Cylinder, and putting the Cover and weight upon it.

The Weight is only about once or twice that of the curd, and applied directly without any leverage, because the entire surface of the Press that comes in contact with the curd is perforated, and furnishes such an easy escape for the whey and gases that the curd is easily made to assume its proper size and solidity without any loss of its richness.

The style of the work is such as to present throughout a smooth and true surface to the curd. As you are filling the Press, be sure to get the curd in even. This is done by occasionally leveling and pressing it down with the hands. By doing this the cheese will be evenly pressed, and have a smooth rind.

It is necessary to move the Cylinder occasionally while pressing cheese, to keep the perforations open if used without a strainer. That part of the press that comes in contact with the curd should be greased to keep it from sticking, if used without a strainer.

Flies should be kept away from the cheese while it is being pressed. This can be done by spreading a cloth over the press, or wrapping it around the hoop.

The press should never be scalded with any whey on it; if it is, the whey will adhere and cause the press to be rough.

The great advantages of this press are: 1. It can be used with, or without, a strainer; it occupies but a little room, does the work as well as any, and better than the most of presses. 2. It can be used for straining lard, tallow, currant or any other juices for making wines and jellies, and tomatoes for catsup, &c.

TESTIMONIALS.

We, the undersigned, hereby certify that we have used, and thoroughly tested, the Cheese Press patented by C. A. Coddington, July 16, 1861, and Jan. 28, 1862, and from our personal knowledge we do confidently recommend it to all in want of a good, reliable Press. From the simplicity of its construction, the ease with which it may be managed, and the facility of increasing or diminishing the pressure, we believe it the best thing of the kind ever invented, and well worthy to take the place of all lever or atmospheric Presses.

CHARLES ANDRUS,
SARAH E. ANDRUS,
CLARK HENIKA.

Battle Creek, Cal. Co., Mich.
" " "
" " "

SUSAN HENIKA,	Battle Creek, Cal. Co., Mich.		
JOHN STEWART,	"	"	"
ANNA A. STEWART,	"	"	"
HELEN VANWERT,	"	"	"
S. P. CADY,	Marshall,	"	"
ADELIA CADY,	"	"	"
DR. GEORGE HASKELL,	Bedford,	"	"
EUNICE P. HASKELL,	"	"	"
ELI CLINTON,	Charleston, Kal. Co.,	"	"
CATHERINE CLINTON,	"	"	"
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WM. BAKER,	"	"	"
ANN BAKER,	"	"	"
GEORGE P. MEERILL,	"	"	"
SABRA MERRILL,	"	"	"
C. M. SPRAGUE,	"	"	"
ELIZABETH SPRAGUE,	"	"	"
D. S. CALLENDER,	"	"	"
C. P. CALLENDER,	"	"	"
A. B. TYLER,	"	"	"
SARAH TYLER,	"	"	"
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E. C. BRACY,	"	"	"
ELIZA N. BRACY,	"	"	"
REV. M. LAWRENCE,	Hickory Corners, Barry Co.,	"	"
NINIAH LAWRENCE,	"	"	"
EBEN PENNOCK,	"	"	"
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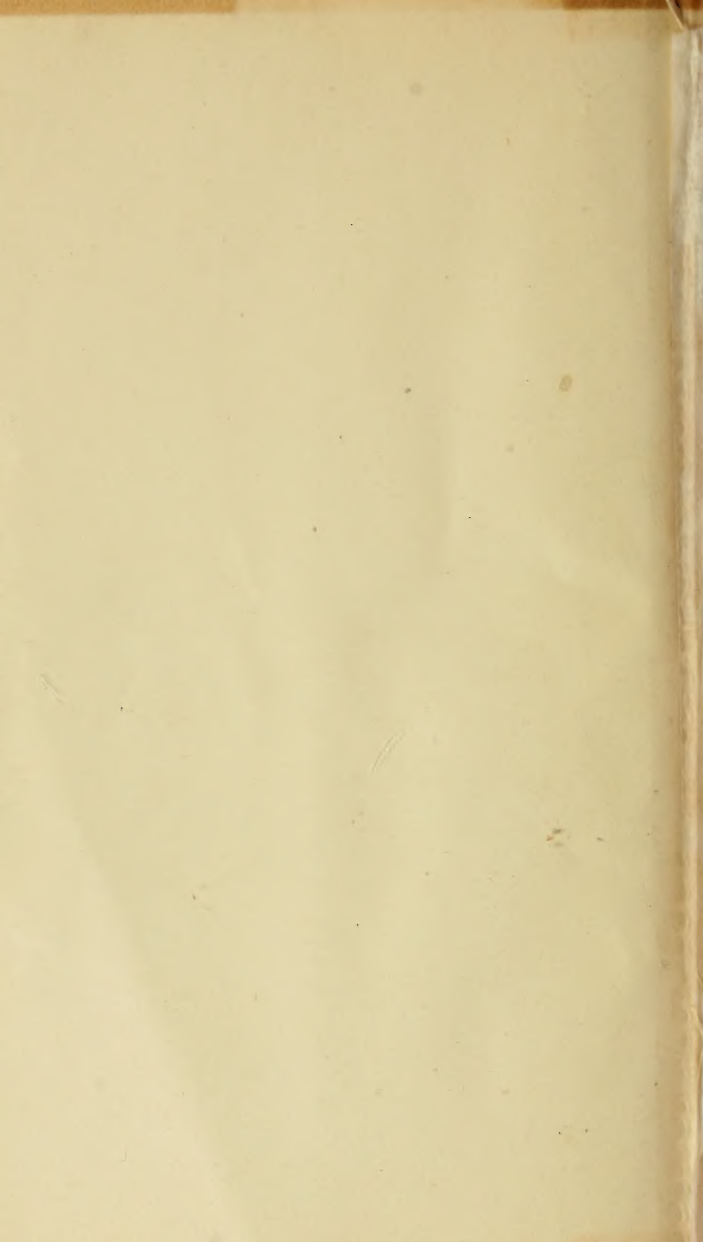
C. A. CODDING,

BATTLE CREEK, MICH.



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